What is claimed is:

1. A wire grid polarizer with double metal layers, comprising:

a transparent substrate;

an array of parallel and elongated dielectric layers formed on the transparent substrate, wherein the dielectric layers have a period and a trench is located between adjacent dielectric layers;

a first metal layer having a first thickness formed in the trench; and

a second metal layer having a second thickness and a width formed on each dielectric layer, wherein the first and second metal layers are separated by a vertical distance;

wherein the period is not greater than 250nm;

wherein the first thickness is not greater than 150nm and is equal to the second thickness;

wherein the vertical distance is not greater than 100nm;

wherein the ratio of the width to the period is in a range of 25~75%.

2. The wire grid polarizer according to claim 1, wherein the transparent substrate is exposed in the trench.

3. The wire grid polarizer according to claim 1, wherein a remaining dielectric layer is formed on a bottom of the trench.

4. The wire grid polarizer according to claim 1, wherein a thickness of the transparent substrate is 500~1500nm.

5. The wire grid polarizer according to claim 4, wherein the transparent substrate is a glass or plastic substrate.

6. The wire grid polarizer according to claim 1, wherein the dielectric layers are PMMA (polymethyl methacrylate) layers.

7. The wire grid polarizer according to claim 1, wherein the first metal layer is an Au, Ag, Cu or Al layer.

8. The wire grid polarizer according to claim 1, wherein the second metal layer is an Au, Ag, Cu or Al layer.

9. The wire grid polarizer according to claim 1, wherein the first and second metal layers comprise the same material.

10. The wire grid polarizer according to claim 1, further comprising:

a protective layer formed on the first and second metal layers.

11. The wire grid polarizer according to claim 10, wherein the protective layer is a SiO_2, SiN or SiON layer.

12. The wire grid polarizer according to claim 1, wherein the period is in a range of 10~250nm.

13. The wire grid polarizer according to claim 1, wherein the first or second thickness is in a range of 30~150nm.

14. The wire grid polarizer according to claim 1, wherein the vertical distance is in a range of 10~100nm.

15. A wire grid polarizer with double metal layers, comprising:

a transparent substrate;

an array of parallel and elongated dielectric layers formed on the transparent substrate, wherein the dielectric layers have a period and a trench is located between adjacent dielectric layers;

a first metal layer having a first thickness formed in the trench; and

a second metal layer having a second thickness and a width formed on each of the dielectric layers, wherein a vertical distance is between the first and second metal layers;

wherein the period is in a range of 10~250nm;

wherein the first thickness is in a range of 30~150nm and is equal to the second thickness;

wherein the vertical distance is in a range of 10~100nm;

wherein the ratio of the width to the period is in a range of 25~75%.

16. The wire grid polarizer according to claim 15, wherein the transparent substrate is exposed in the trench.

17. The wire grid polarizer according to claim 15, wherein a remaining dielectric layer is formed on a bottom of the trench.

18. A method of forming a wire grid polarizer with double metal layers, comprising the steps of:

providing a transparent substrate;

forming an array of parallel and elongated dielectric layers on the transparent substrate, wherein the dielectric layers have a period and a trench is located between adjacent dielectric layers;

forming a first metal layer having a first thickness in the trench; and

forming a second metal layer having a second thickness and a width on each dielectric layer, wherein the first and second metal layers are separated by a vertical distance;

wherein the period is in a range of 10~250nm;

wherein the first thickness is in a range of 30~150nm and is equal to the second thickness;

wherein the vertical distance is in a range of 10~100nm;

wherein the ratio of the width to the period is in a range of 25~75%.

19. The method according to claim 18, the transparent substrate is exposed in the trench.

20. The method according to claim 18, wherein a remaining dielectric layer is formed on a bottom of the trench.

21. The method according to claim 18, further comprising the step of:

forming a protective layer on the first and second metal layers.

22. The method according to claim 18, wherein the dielectric layers are formed by photolithography or nanoimprint.